

62

RAILWAY ENGINEERING



AND MAINTENANCE OF WAY

VOL. III.

CHICAGO

MARCH, 1907

NEW YORK

No. 3.

Hayes Derails

HAYES TRACK APPLIANCE CO.

Geneva, N. Y.

McInnes Tool Steel for Track Drills and Tools

High

Grade

McInnes Steel Co., Ltd., Corry, Pa.

RODGER BALLAST CAR CO. CONVERTIBLE CAR --See Page 8

LOCOMOTIVES

COACHES

CARS

New Freight Cars

Built to any specification, in any quantity for **PROMPT DELIVERY**

HICKS LOCOMOTIVE AND CAR WORKS, Builders, CHICAGO

HICKS
LOCOMOTIVE
AND
CAR WORKS
CHICAGO



THE HANNA MFG. CO.

High-Grade
Engineering
Instruments

380 River St., Troy, N. Y.
Illustrated Catalogue on application.

SPENCER OTIS CO.

Tie Plates
Nut Locks
Rail Benders

CHICAGO

OMAHA

Sharpens Small Tools

at the work.

It has been found to be of great value. Can be carried anywhere. It is right at the work and that means economy. It will pay you to investigate. Prices and circulars on request.



ROYAL MFG. CO.

200 E. Walnut St. Lancaster, Pa.

Turnbuckles Forgings



**Cleveland City Forge
and Iron Co.**

CLEVELAND,

OHIO

EVENS & HOWARD FIRE BRICK CO.

ESTABLISHED 1855

ST. LOUIS, MO.

Makers of **High Grade Sewer and Culvert Pipe** for **Railroad Construction**,
Locomotive Tile, Square Edge, Flanged and Boiler Tile,
Cupola and Furnace Blocks.

**Fire Brick, and Shapers, Flue Lining, Wall Co., ing, Chimney Tops, Gut-
ter Pipe and Drain Tile**

Laundry Tubs, Sinks, Horse Feed Boxes and Earthenware Specialties.

WRITE US FOR PRICES

General Offices: 920 Market Street

SMOKE JACKS PAUL DICKINSON 1403 SECURITY BLDG
CHICAGO

SIGNAL LAMPS

With Balanced Top
Draught Ventilation

Made of No. 18 Gauge Steel, all parts riveted

Long Time Burners

OF LATEST DESIGN

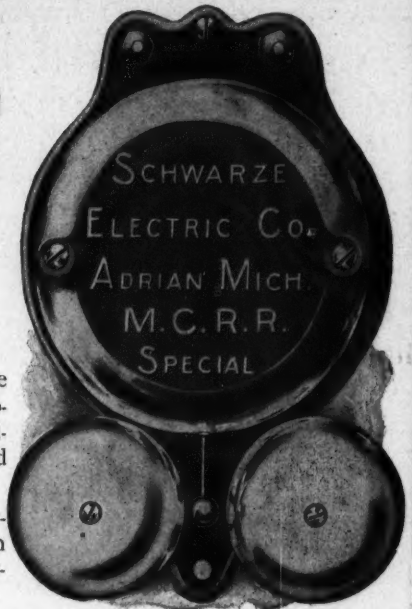
Engine Marker Lamps
Caboose and Train Lamps
Locomotive Headlights

Manufactured by
The Dressel Railway Lamp Works

Adreon & Company
ST. LOUIS

Specify

**Schwarze
Crossing
Bells--
Signal
Bells**



and increase
your equip-
ment in effi-
ciency and
economy.

They oper-
ate on high
tension cur-
rent.

They save 80% of Battery Current. They operate
in series or multiple, and they are the

"LOUDEST ON THE LINE."

SCHWARZE ELECTRIC COMPANY

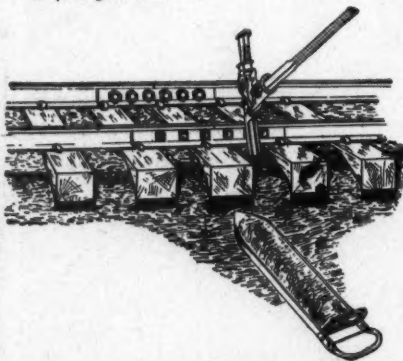
Main Office and Factory, ADRIAN, MICH.
CHICAGO BRANCH: 824 Dearborn St. SAN FRANCISCO BRANCH: 2500 California St.

WALTERS' BALLAST PLACING DEVICE

Patented March 21, 1905

Has been placed in service on eleven trunk lines
and eight smaller railroads since April 1st.

FIG. 1—Showing ballast removed from end of ties to be raised,
track jacked up and device in position to receive ballast
for placing under tie.



We will guar-
antee that ev-
ery particle of
ballast will re-
main under tie
and that ma-
chine will
work in any
kind of ballast.

**Order
Samples**

Satisfaction
guaranteed or
money refund-
ed.

Reference:
Any Bank
in the
City.

FIG. 2—Showing pan removed, ballast under tie, and cleaner
ready to be withdrawn.



WALTERS & OKELL
Ft. Madison, Iowa

Gibraltar Bumping Post

**STRUCTURAL STEEL
INSTALLATION SIMPLE
MINIMUM COST OF MAINTENANCE**



Built on Strictly Engineering Principles
and possesses strength, durability, and superiority of design
for resisting impact. Pleased to send new Catalog No. 8 on
request.

McCord & Company

CHICAGO

NEW YORK



For Wrecking Outfits and Tool Car Use

"RELIANCE" HYDRAULIC JACKS

They are reliable and economical. Work horizontally Lowered by thumb-key.

A JUSTICE SPIKE PULLER

saves half the time and all the spikes. Has its own trig for second bite.

Write for Catalogs and Prices

PHILIP S. JUSTICE & COMPANY,

421 Chestnut Street

PHILADELPHIA, PA., U. S. A.



FIRST BITE OF SPIKE



SECOND BITE



OUT WITHOUT BENDING

HUDSON TRACK DRILLS

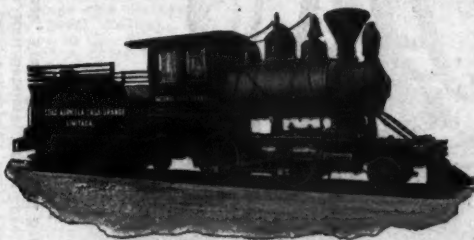


Made of High Power Steel. Will cut faster and outwear any other drill. Made with Flatted Shanks at no additional cost. Complete line of Hudson Taper Shank, Straight Shanks, and Jobbers Length drills carried in stock.

Baldwin Steel Company

133 Rensselaer Street

NEW YORK



LIGHT LOCOMOTIVES

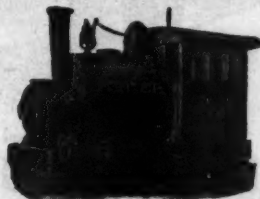
For all Classes of Service

VULCAN IRON WORKS

WILKES BARRE, PA.



No. 68. "Steel Works."



No. 36. "Contractors."

The Engineering Department

of Every Large Railroad and Every Railroad Contractor should have a copy of our Illustrated Catalogue with 200 pages of Useful Information not elsewhere printed. Address:

H. K. PORTER COMPANY,

Contractors' Locomotives on Hand in Stock

CORNER SIXTH AND WOOD
PITTSBURGH, PA.

H. J. McKEOWN

TEL.
MAIN
3392

MANUFACTURERS OF



Contractors
Plant,
Stone
Hoisting
and Pile
Driving
Engines

Crabs and
Derrick
Irons a
Specialty

Jobbing Promptly Attended to

612 E. FRONT ST., BET. PIKE AND BUTLER

CINCINNATI, OHIO



"METAL STEEL" PAINT

ST. LOUIS SURFACER & PAINT CO., MAKERS.
ST. LOUIS

FOR
Structural Iron
Bridges,
Tanks, Etc.

CLASSIFIED INDEX OF ADVERTISERS.

Anti Rail Creeper.
Adreon & Co., St. Louis.

Asphalt.
Detroit Tool Co., Detroit, Mich.

Asphalt Roofing.
Stowell Mfg. Co., Jersey City, N. J.

Asphalt Roofing Paints.
Carey Mfg. Co., The Phillip, Cincinnati, O.

Ballast Cars.
Rodger Ballast Car Co., Chicago.

Ballast Flacing Device.
Adreon & Co., St. Louis.

Rodger Ballast Car Co., Chicago.
Walters & Okell, Ft. Madison, Ia.

Ballast Unloaders.
Rodger Ballast Car Co., Chicago.

Bell Ringers.
Adreon & Co., St. Louis, Mo.

Block Signals.
Blocks and Tackles.
Patterson Co., W. W., Pittsburg, Pa.

Blowers.
Blue Print Papers.
Kolesh & Co., New York.

Blue Printing Machines.
Kolesh & Co., New York.

Boarding Camps.
Railway Boarding Camp & Catering Co.,
Moline, Ill.

Bolts and Nuts.
Adreon & Co., St. Louis, Mo.

Railway Supply Co., St. Louis.

Books.
Andel & Co., Theo., New York.

Wiley, John & Sons, New York.

Bridge Paint.
Acme White Lead & Color Co., Detroit,
Mich.

Carey Mfg. Co., The Phillip, Cincinnati, O.
Detroit Graphite Mfg. Co., Detroit, Mich.

**Dixon, Joseph, Crucible Co., Jersey City,
N. J.**

Sherwin-Williams Co., Cleveland, O.
Stowell Mfg. Co., Jersey City, N. J.

Suydam Co., M. B., Pittsburg, Pa.

Brushes, Paint.
Kim, John, & Co., Philadelphia, Pa.

Rubbersett Brush Co., Newark, N. J.

Bumping Posts.
Mechanical Mfg. Co., Chicago.

McCord & Co., Chicago.

Cars.
Torbert, A. C. & Co., Chicago.

Cars Ballast.
Rodgers Ballast Car Co., Chicago.

Cars Dump.
Rodgers Ballast Car Co., Chicago.

Cars Rebuilt.
Atlantic Equipment Co., New York.

Hicks Car & Locomotive Works, Chicago.

Car Replacers.
Buda Foundry & Mfg. Co., Chicago.

Cars, Second Hand.
Atlantic Equipment Co., New York.

Cast Iron Pipe.
Yale, Julian L., & Co., Chicago

Castleguards.
Adreon & Co., St. Louis, Mo.

Buda Foundry & Mfg. Co., Chicago.
Johnson, The W. P. Co., Chicago.

Chains.
Adreon & Co., St. Louis, Mo.

Patterson Co., W. W., Pittsburg, Pa.

Chimney Cast Iron.
Dickinson, Paul, Chicago.

Clay Pipe.
Evans & Howard Fire Brick Co., St.
Louis, Mo.

Coal and Ore Handling Machinery.
Rodger Ballast Car Co., Chicago.

Gold Water Paints.
Carey Mfg. Co., The Phillip, Cincinnati, O.

Combination Tools.
Detroit Tool Co., Detroit, Mich.

Combination Vise.
Detroit Tool Co., Detroit, Mich.

Computing Machines.
Kolesh & Co., New York.

Concrete Pipe, Reinforced.
Reinforced Concrete Pipe Co., Jackson,
Mich.

Condunits.
Evans & Howard Fire Brick Co., St.
Louis, Mo.

J. G. WHITE & COMPANY

INCORPORATED

Engineers, Contractors

43-49 Exchange Place, New York, N. Y.

LONDON CORRESPONDENTS: J. G. White & Co., Limited, 22a College Hill, Cannon St.

CANADIAN CORRESPONDENTS: Canadian White Company, Limited, Montreal

Principal Philippine Office: Manila, P. I.

A. D. DOTY, O. E., Manager

THE

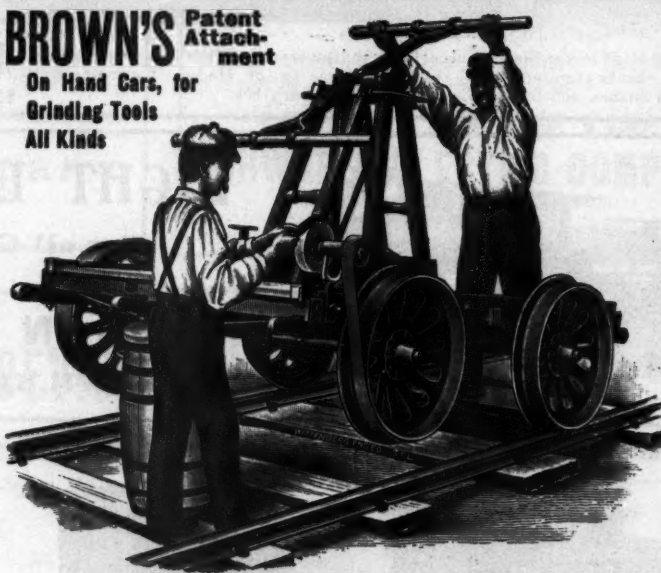
Established 1900

NEW YORK ENGINEERING AGENCY

35 WARREN STREET, NEW YORK CITY

High Grade Technical Men Furnished

BROWN'S Patent
Attachment
On Hand Cars, for
Grinding Tools
All Kinds



Hand Cars, Push Cars, Velocipede Cars, Track Laying Cars, Ve-
rons Track Tools, Rail Sanders, Track Levels, Jansen Track Jacks,
Friction Track Jack, Track Shovel, Rail Bases.

Dealers in everything used in Constructing and Operating Railroads

THE RAILWAY SUPPLY CO.

Nos. 7 and 9, North Third St.
ST. LOUIS

EXCLUSIVE MANUFACTURERS

J. A. McGREW, Pres.

H. D. BRUNING, V. Pres. and Mgr.

P. C. CALDWELL, Sec. and Treas.

The NATIONAL ENGINEERING CO.

(Inc.)

Architects, Engineers, and Constructors.

Consultation Expert Reports.

COLUMBUS, OHIO

Designs, Estimates, Specifications, Inspection and Reports upon Steam and Electric
Railways, Bridges, Buildings and Foundations.

PAROID

"IT LASTS"

ROOFING

has the en-
dorsement of some of
the largest railroad sys-
tems in this country for
all kinds of railroad
buildings.

F. W. BIRD & SON, MAKERS

CHICAGO

EAST WALPOLE, MASS.

NEW YORK



KOLESCH & CO.

138 Fulton Street, NEW YORK

MANUFACTURERS OF HIGH-GRADE

Surveying Instruments Drawing Materials

"Precision" Slide Rules, 5, 8, 10, 15, 20 inches long
SEND FOR ILLUSTRATED CATALOGUE

CLASSIFIED INDEX OF ADVERTISERS
(CONTINUED)**The Keystone Blast Hole Driller**

is a Portable Well Drilling Machine, especially adapted for work in heavy R. R. cuts and Canal Excavation; River and Harbor Exploration; Concrete Piling, etc. We also make machines for Mineral Prospecting for Gold and Zinc; Percussion Coal Coring Tools, Water and Oil Rigs for all depths.

OUR 5 CATALOGS COVER THE FIELD.

KEYSTONE DRILLER CO. Marginal Road, Beaver Falls, Pa.

Conduits—Reinforced Concrete.
Reinforced Concrete Pipe Co., Jackson, Mich.

Contractors.

White, J. G. & Co., New York.
Contractors' Equipment and Supplies.
Adreon & Co., St. Louis.
Atlantic Equipment Co., New York.
McKeown, H. J., Cincinnati, O.
Porter, H. K., Co., Pittsburgh.
Railway Boarding Camp & Catering Co., Moline, Ill.

Railway Supply Co., St. Louis.
Rodger Ballast Car Co., Chicago.

Contractors' Light.

Wells Light Mfg. Co., New York.
Contractors' Locomotives.
Vulcan Iron Works, Wilkesbarre, Pa.

Conveyors, Belt.

Coupler and Parts.
Adreon & Co., St. Louis, Mo.

Crabs.

McKeown, H. J., Cincinnati, O.

Cranes, Revolving.**Crosscutting.****Cross Arms.****Crossing Rails.**

Schwarze Electric Co., Adrian, Mich.

Crossing Gates.

Buda Foundry & Mfg. Co., Chicago.

Crossing Signals.

Adreon & Co., St. Louis.

Crossings (See Frogs and Crossings.)

McKeown, H. J., Cincinnati, O.

Culvert Pipe Clay.

Evans & Howard Fire Brick Co., St. Louis, Mo.

Culvert Pipe—Reinforced Concrete.

Reinforced Concrete Pipe Co., Jackson, Mich.

Derricks.

Hayes Track Appliance Co., Geneva, N. Y.

Derrick and Derrick Outfits.

Ditching and Excavating Machinery.

Atlantic Equipment Co., New York.

Door Stops and Holders.**Doors, Steel Rolling.**

Adreon & Co., St. Louis, Mo.

Columbus Steel Rolling Shutter Co., Columbus, O.

Drain Pipe.

Evans & Howard Fire Brick Co., St. Louis, Mo.

Draughting Room Supplies.

Kolesh & Co., New York.

Dredges.

Atlantic Equipment Co., New York.

Dredges Elevator Bucket.**Dredges, Hydraulic.**

Keystone Driller Co., Beaver Falls, Pa.

Drop Forgings.

Williams & Co., J. H., Brooklyn, N. Y.

Dry Kilns.**Drying Apparatus.**

Rodgers Ballast Car Co., Chicago.

Electric Crossing Rails.

Schwarze Electric Co., Adrian, Mich.

Electric Power Plants.**Elevators.****Employment Bureau.**

New York Engineering Agency, New York.

Engineers, Civil and Consulting.

White, J. G. & Co., New York.

Engines, Gas and Gasoline.

Otto Gas Engine Works, Chicago.

Engines, Hoisting.

McKeown, H. J., Cincinnati, O.

Engines, Steam.**Excavating Machinery.**

Atlantic Equipment Co., New York.

Expanded Metal.

Merritt & Co., Philadelphia, Pa.

Fence Posts.**Fireproof Construction Material.****Fire Proof Paint.**

Detroit Graphite Mfg. Co., Detroit.

Flooring and Moulding Machines.**Forges, Combination.**

Detroit Tool Co., Detroit, Mich.

Forges, Portable.

Railway Supply Co., St. Louis.

Forgings.

Cleveland City Forge & Iron Co., Cleveland, O.

Freight House Doors.

Columbus Steel Rolling Shutter Co., Columbus, O.

Frogs and Crossings.

Buda Foundry & Mfg. Co., Chicago.

Indianapolis Switch & Frog Co., Springfield, O.

Frog and Switch Planers.**Fuel Economizers.**

Furnace Feeders for Shavings, Automatic.

Gas Engines.

Otto Gas Engine Works, Chicago.

Gaskets.

McCord & Co., Chicago.

Railway Supply Co., St. Louis.

Gates, Railroad Crossing.

Buda Foundry & Mfg. Co., Chicago.

Graphite.

Detroit Graphite Mfg. Co., Detroit.

Dixon, Jos., Crucible Co., Jersey City, N. J.

Railway Supply Co., St. Louis.

Sherwin-Williams Co., Cleveland, O.

Graphite Paint.

Wadsworth-Howland Co., Chicago.

Greenhouses.**Hair, Felt, Etc.****Hand Cars.**

Buda Foundry & Mfg. Co., Chicago.

Railway Supply Co., St. Louis.

Hand Rail Paint.

Wadsworth-Howland Co., Chicago.

Heating and Ventilating.

Erie Heating Co., Chicago.

Heating and Welding Compound.**Hoisting and Conveying Machinery.****Hoisting Engines.**

McKeown, H. J., Cincinnati, O.

Otto Gas Engine Works, Chicago.

Hoists.**Hoists, Pneumatic.****Inspection and Tests.****Inspection Cars.**

Buda Foundry & Mfg. Co., Chicago.

Railway Supply Co., St. Louis.

Instruments, Engineering and Surveying.

Hanna Mfg. Co., Troy, N. Y.

Kolesh & Co., New York.

Jacks.

Buda Foundry & Mfg. Co., Chicago.

Dudgeon, Richard, New York.

Duff Mfg. Co., Allegheny, Pa.

Henderers, A. L., Sons, Wilmington, Del.

Justice, P. S. & Co., Philadelphia, Pa.

Railway Supply Co., St. Louis.

Watson-Stillman Co., New York.

Jacks, Hydraulic.

Dudgeon, Richard, New York.

Henderers, A. L., Sons, Wilmington, Del.

Justice, P. S. & Co., Philadelphia, Pa.

Railway Supply Co., St. Louis.

Watson-Stillman Co., New York.

Journal Box Brasses.

Adreon & Co., St. Louis, Mo.

Journal Box Lids.

Adreon & Co., St. Louis, Mo.

Journal Box Wedges.

Adreon & Co., St. Louis, Mo.

Lamps and Lanterns.

Adreon & Co., St. Louis, Mo.

Railway Supply Co., St. Louis.

Lamps, Long Time Burners.

Adreon & Co., St. Louis, Mo.

Leads Steel Watering.**Lifting Derricks.**

Hayes Track Appliance Co., Geneva, N. Y.

Light, Locomotives (See Locomotive Contractors.)**Lights, Contractors.**

Wells Light Mfg. Co., New York.

Railway Supply Co., St. Louis.

Lockers, Metal.

Merritt & Co., Philadelphia.

Locomotives.

Torbert, A. C. & Co., Chicago.

Vulcan Iron Works, Wilkesbarre, Pa.

Locomotive Coaling Stations.**Locomotive Cranes (See Cranes Locomotives.)****Locomotives, Compressed Air.**

Atlantic Equipment Co., New York.

Porter, H. K. Co., Pittsburgh, Pa.

Locomotives, Contractors.

Atlantic Equipment Co., New York.

Hicks, F. M. & Co., Chicago.

Porter, H. K. Co., Pittsburgh.

Locomotives, Electric.

Atlantic Equipment Co., New York.

Porter, H. K. Co., Pittsburgh.

Locomotive Headlights.

Adreon & Co., St. Louis, Mo.

Locomotives, Geared.**Locomotives, Mine.**

Atlantic Equipment Co., New York.

Porter, H. K. Co., Pittsburgh.

Locomotives, Road.

Atlantic Equipment Co., New York.

Hicks Locomotive & Car Works, Chicago.

Locomotives, Second Hand.

Atlantic Equipment Co., New York.

Hicks, F. M. Co., Chicago.

Hicks Locomotive & Car Works, Chicago.

Longing Cars.

Buda Foundry & Mfg. Co., Chicago.

Railway Supply Co., St. Louis.

Lubricants (Graphite).

Dixon, Joseph, Crucible Co., Jersey City, N. J.

Lumber.**Mail Cranes and Catchers.****Measuring Tapes.**

Hanna Mfg. Co., Troy, N. Y.

Kolesh & Co., New York.

Nut Locks.

American Lock Nut Co., Boston, Mass.

Railway Supply Co., St. Louis.

Spencer Otis Co., Chicago.

Oil Tanks.

Bowser, S. F. & Co., Ft. Wayne, Ind.

Paints.

Acme White Lead & Color Works, Detroit.

Carey Mfg. Co., The Philip, Cincinnati, O.

Detroit Graphite Mfg. Co., Detroit.

Devos, P. W. & Co., New York.

Dixon, Joseph, Crucible Co., Jersey City, N. J.

Sherwin-Williams Co., Cleveland, O.

St. Louis Surfact & Paint Co., St. Louis, Mo.

Paint and Varnish Removers.**Perforated Metal.**

Adreon & Co., St. Louis, Mo.

Railway Supply Co., St. Louis.

Pile Driving Engines.

McKeown, H. J., Cincinnati, O.

Pipe, Cast Iron.

Yale, Julian L. & Co., Chicago.

Pipe Clay Culvert.

Evans & Howard Fire Brick Co., St. Louis, Mo.

Pipe Joint Paste.

Detroit Graphite Mfg. Co., Detroit.

Pipe, Reinforced Concrete.

Reinforced Concrete Pipe Co., Jackson, Mich.

Pivot Derricks.

Hayes Track Appliance Co., Geneva, N. Y.

Plows for Grading Work.

Brinly-Hardy Co., Louisville, Ky.

Pneumatic Crossing Gates (See Gates Railroad Crossing.)**Pneumatic Gates.**

Buda Foundry & Mfg. Co., Chicago.

Pumps.

Bowser, S. F. & Co., Ft. Wayne, Ind.

Pumps, Roller Test.

Henderers, A. L. Sons, Wilmington, Del.

Punches.

Henderers, A. L. Sons, Wilmington, Pa.

Push Cars.

Buda Foundry & Mfg. Co., Chicago.

Quarrying Machinery.**Rail Benders.**

Adreon & Co., St. Louis.

Buda Foundry & Mfg. Co., Chicago.

Spencer Otis Co., Chicago.

Rail Brakes.

Adreon & Co., St. Louis.

Buda Foundry & Mfg. Co., Chicago.

Railway Supply Co., St. Louis.

Rail Drills.

Buda Foundry & Mfg. Co., Chicago.

Indianapolis Switch & Frog Co., Springfield, O.

McInnes Steel Co., Corry, Pa.

Railway Supply Co., St. Louis.

Rail Joints.

Buda Foundry & Mfg. Co., Chicago.

Snow, J. H. Indianapolis, Ind.

Rail Saw.

Adreon & Co., St. Louis.

Railroad Equipment and Supplies.

Adreon & Co., St. Louis.

Atlantic Equipment Co., New York.

Buda Foundry & Mfg. Co., Chicago.

Hicks Locomotive & Car Works, Chicago.

McCord & Co., Chicago.

Rails (New.)

Atlantic Equipment Co., New York.

Rails (Second Hand.)

Atlantic Equipment Co., New York.

Hicks Locomotive & Car Works, Chicago.

Railway Equipment and Supplies.

Railway Supply Co., St. Louis.

Railways Supplies, General.

Adreon & Co., St. Louis.

Buda Found

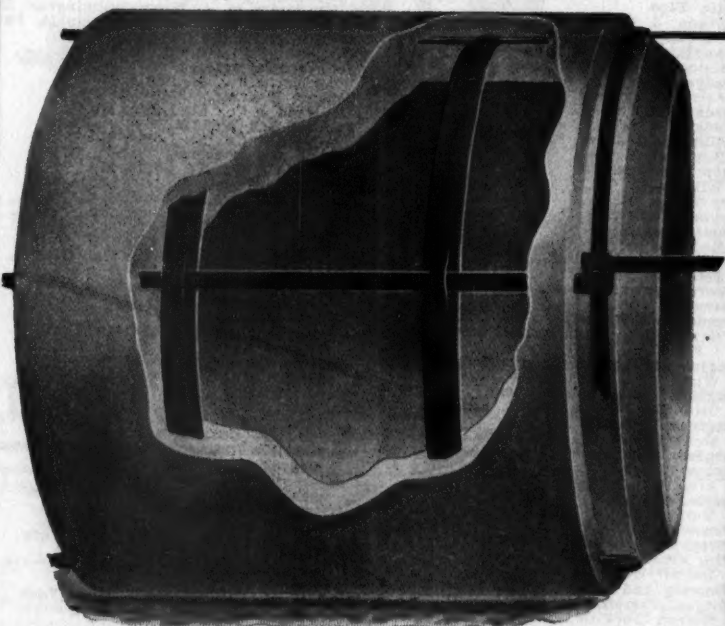
CLASSIFIED INDEX OF ADVERTISERS
(CONTINUED)

- Rolling Stock.**
Atlantic Equipment Co., New York.
Hicks, F. M., & Co., Chicago.
- Roof Paint.**
Bird, F. W. & Son, East Walpole, Mass.
Carey Mfg. Co., The Philip, Cincinnati, O.
Stowell Mfg. Co., Jersey City, N. J.
- Roofing.**
Bird, F. W. & Son, E. Walpole, Mass.
Stowell Mfg. Co., Jersey City, N. J.
- Rope.**
Round House Doors.
Columbus Steel Rolling Shutter Co., Columbus, O.
- Safety Gates.**
Buda Foundry & Mfg. Co., Chicago.
- Sand Drills.**
Parkhurst & Wilkinson, Chicago.
- Scales.**
Buda Foundry & Mfg. Co., Chicago.
- Second Hand Equipment.**
Atlantic Equipment Co., New York.
Hicks Locomotive & Car Works, Chicago.
- Semaphore Signals.**
Wendt Coupler Co., Marshfield, Wis.
- Sewer Pipes.**
Evans & Howard Fire Brick Co., St. Louis, Mo.
- Shovels.**
Jackson Tool & Shovel Co., Montpelier, Ind.
Railway Supply Co., St. Louis.
- Shutters, Rolling Steel.**
Adreon & Co., St. Louis, Mo.
Columbus Steel Rolling Shutter Co., Columbus, O.
- Signal Bells for Crossings.**
Schwarze Electric Co., Adrian, Mich.
- Signaling Device.**
Wendt Coupler Co., Marshfield, Wis.
- Signal Lamps.**
Adreon & Co., St. Louis, Mo.
Railway Supply Co., St. Louis.
- Signals.**
Adreon & Co., St. Louis, Mo.
- Slide Rules.**
Kolesch & Co., New York.
- Smoke Stacks.**
Adreon & Co., St. Louis, Mo.
Dickinson, Paul, Chicago.
- Spike and Bolt Pullers.**
Justice, P. S., & Co., Philadelphia.
- Stacks, Smoke.**
Dickinson, Paul, Chicago.
- Stand Pipes.**
Adreon & Co., St. Louis.
- Station Paint.**
Wadsworth-Howland Co., Chicago.
- Steam Shovels.**
Atlantic Equipment Co., New York.
Torbert, A. C. & Co., Chicago.
- Steel for Track Drills and Tools.**
McInnes Steel Co., Corry Pa.
- Stoves.**
Buda Foundry & Mfg. Co., Chicago.
- Structural Iron Paints.**
Carey Mfg. Co., The Philip, Cincinnati, O.
St. Louis Surfacter & Paint Co., St. Louis, Mo.
- Surveying Instruments.**
Hanna Mfg. Co., Troy, N. Y.
Kolesch & Co., New York.
- Switches and Switch Stands.**
Buda Foundry & Mfg. Co., Chicago.
- Switch Target Stands.**
Hayes Track Appliance Co., Geneva, N. Y.
- Tackle Blocks.**
Patterson Co., W. W., Pittsburg, Pa.
- Tanks and Tank Fixtures.**
American Valve & Meter Co., Cincinnati, O.
Otto Gas Engine Works, Chicago.
- Tie Plates.**
Adreon & Co., St. Louis.
Spencer Otis Co., Chicago.
- Tools.**
Detroit Tool Co., Detroit, Mich.
- Tool, Combination for Roundhouses, Etc.**
Detroit Tool Co., Detroit, Mich.
- Tool Steel.**
McInnes Steel Co., Corry Pa.
- Track Drills.**
Buda Foundry & Mfg. Co., Chicago.
Baldwin Steel Co., New York.
McInnes Steel Co., Corry, Pa.
Millers-Falls Co., New York.
- Track Gages and Level.**
Buda Foundry & Mfg. Co., Chicago.
Railway Supply Co., St. Louis.
- Track Jacks (See Jacks.)**
- Track Laying Machinery.**
D. F. Holman Track Layer Co., Chicago.
- Track Signs.**
Adreon & Co., St. Louis.
Buda Foundry & Mfg. Co., Chicago.
- Track Tools.**
Adreon & Co., St. Louis.
Buda Foundry & Mfg. Co., Chicago.
Detroit Tool Co., Detroit, Mich.
Millers-Falls Co., New York.
Railway Supply Co., St. Louis.
Walters & Okell, Ft. Madison, Ia.
- Transfer Tables.**
Nichols, Geo. P., & Bro., Chicago, Ill.
- Trench Braces.**
Potter Mfg. Co., Indianapolis, Ind.
- Trench Machinery.**
Potter Mfg. Co., Indianapolis, Ind.
- Turnbuckles.**
Cleveland City Forge & Iron Co., Cleveland, O.
- Turntables.**
Nichols, Geo. P., & Bro., Chicago.
- Valves.**
American Valve & Meter Co., Cincinnati, O.
- Varnishes.**
Devos, F. W., & Co., New York.
- Velocipedes, Railway.**
Buda Foundry & Mfg. Co., Chicago.
Railway Supply Co., St. Louis.
- Ventilators.**
Ventilators, Cast Iron.
Vices.
Detroit Tool Co., Detroit, Mich.
Adreon & Co., St. Louis, Mo.
Dickinson, Paul, Chicago.
- Vise, Combination Tool.**
Detroit Tool Co., Detroit, Mich.
- Vices, Pipe.**
Hendersen, A. L. Sons, Wilmington, Del.
- Water Columns.**
American Valve & Meter Co., Cincinnati, O.
- Water Meters.**
American Valve & Meter Co., Cincinnati, O.
- Water Purifiers.**
Kennicott Water Softener Co., Chicago.
- Water Softening Apparatus.**
Kennicott Water Softener Co., Chicago.
- Water Tanks.**
Adreon & Co., St. Louis.
Railway Supply Co., St. Louis.
- Well Drilling Machinery.**
Keystone Driller Co., Beaver Falls, Pa.
- Wire Rope.**
Railway Supply Co., St. Louis.
- Wrecking Cars.**
Buda Foundry & Mfg. Co., Chicago.
- Wrecking Frogs.**
Railway Supply Co., St. Louis.
- Wrenches.**
Williams, J. H., & Co., Brooklyn, N. Y.

Reinforced Concrete Pipe

FOR CONDUITS AND RAILROAD CULVERTS

Reinforced Interlocking Joints Makes It the Strongest and Most Durable. Will Stand Any Fill.

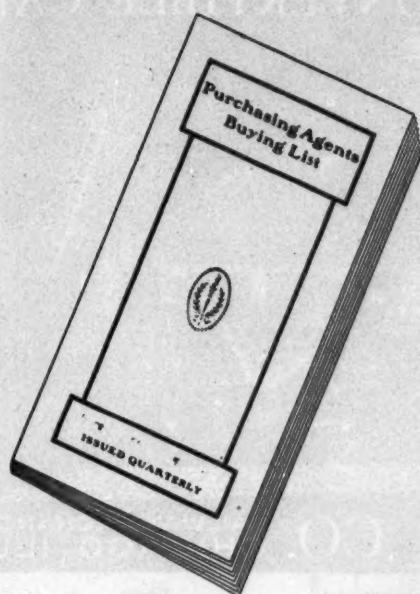


BETTER THAN IRON PIPE

Correspondence of Railroad Engineers and Contractors Solicited.
Write for Our New Illustrated Catalogue. You will be interested.

REINFORCED CONCRETE PIPE CO.

Jackson, Michigan



Have You Seen This?

THE cut shown herewith is a reproduction of the cover of our publication (6½x3½) **PURCHASING AGENTS BUYING LIST**. In it we give a complete classification of all products made, sold or handled by our advertisers in the **RAILWAY MASTER MECHANIC**, **RAILWAY ENGINEERING** and **MODERN MACHINERY**. We send it free to railway officials for their convenience in buying supplies. It is a book of reference and saves time for the official who is too busy to lookup the files of his railway journals when he wants to know who makes or sells anything from a lag screw to a locomotive. No other railway journal publishes such a list as this. It carries **NO ADVERTISING** and is only what it claims to be—a directory of our advertisers for busy railroad officials.

If you have not seen the "Purchasing Agents Buying List" send for it now and a copy of the "Railway Engineering."

You will be interested whether you are a railway official or a railway supply man. We want you both and we can give you good reasons why you need us.

Write us today for further particulars.

Railway Engineering and Maintenance of Way

**RAILWAY
MASTER
MECHANIC**

**MODERN
MACHINERY**

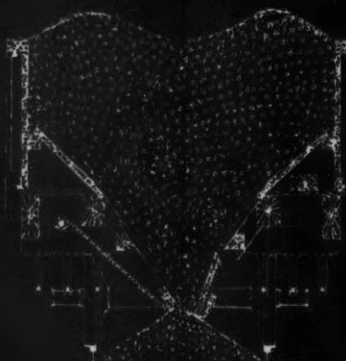
**RAILWAY
SHOP
UP-TO-DATE**

**PURCHASING
AGENTS
BUYING LIST**

Security Building, CHICAGO

RODGER BALLAST HART CONVERTIBLE CAR

THREE CARS IN ONE



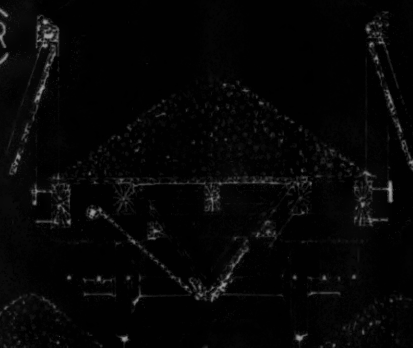
CONSTRUCTION
BALLAST
GENERAL FREIGHT



BUILT OF 30 TO 60 TONS
CAPACITY AND OF EITHER
WOOD OR STEEL

CHANGED FROM CENTER
DUMP TO SIDE DUMP OR
VICE-VERSA IN 20 MIN-
UTES WITHOUT TOOLS

THOUSANDS IN DAILY SERVICE
HAVE PROVEN ITS GREAT
ECONOMY AND PRAC-
TICABILITY.

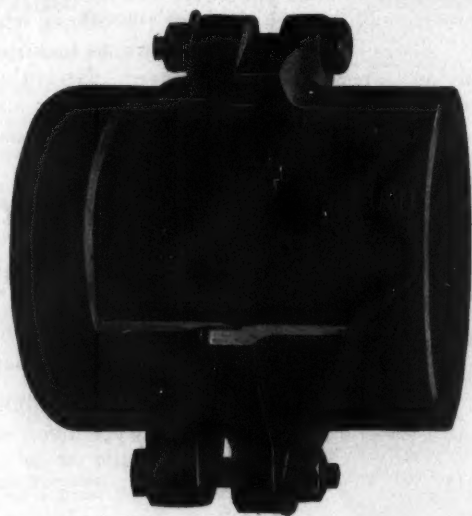


RODGER BALLAST CAR CO. RAILWAY EXCHANGE
CHICAGO, ILL.

Universal Cast Iron Pipe

Patented October 28, 1902

SECTIONAL VIEW OF JOINT



A straight taper joint, machined but not ground.
No lead or other packing material required.
Practically perfect electrical continuity at joints, thus
insuring protection from electrolysis.

MADE BY
CENTRAL FOUNDRY CO.
New York City

Julian L. Yale & Co.

Agents for Railway Trade

Railway Exchange

Telephone Harrison 1211

CHICAGO, ILL.

We Sell
Good

Bridge Paint

Send for an attrac-
tive collection of
half tone engrav-
ings showing promi-
nent bridges paint-
ed with

Superior
Graphite
Paint

—
Detroit Graphite Mfg. Co.,
DETROIT, MICH.

Track Laying by Machinery

Simple—Rapid—Economical

D. F. HOLMAN RAILWAY TRACK LAYER CO.

1751 Railway Exchange, Chicago

ACTUAL ECONOMY

**STEEL POLES,
ROOFS, TANKS,
BRIDGES,
BUILDINGS,
SMOKE-STACKS**

Painted
THIS Season
with

DIXON'S
Silica - Graphite
PAINT

will not
require repainting
for
MANY seasons

Write for
"Colors and Specifications"

Joseph Dixon
Crucible Co.

JERSEY CITY, N. J.



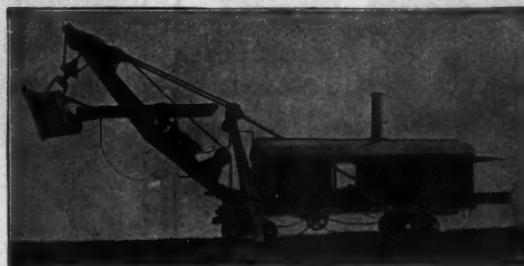
**ELLIS PATENT
BUMPING POST**

Noted for Simplicity, Strength and
Lasting Qualities. Adapted to all
positions.

Mechanical Mfg. Co.,
CHICAGO, ILL.

Steam Shovels, Locomotives, Cars, Etc.

Delivered right out of our shops, All Ready for Service. **SPECIAL—IMMEDIATE DELIVERY**



**MODERN
STEAM
SHOVELS**

Four 65-ton Bucyrus,
2½-yd. dippers, 3
sets engines, excel-
lent shovels.

Three 65-ton Model
"G" Marions, 2½
yd. dippers, inde-
pendent thrashing en-
gines, fine machines.

Four 70-ton Bucyrus, 2½ to 3-yd. dippers, 3 sets engines little used.
One 75-ton Model "80" Marion, 3½-yd. dipper, 3 sets engines, splendid modern shovel.
One 60-ton Giant "D" Vulcan, 2½-yd. dipper, 3 sets engines, first-class.
One 70-ton Giant "C" Vulcan, 2½ to 3-yd. dipper, 3 sets engines, equipped with new
model "60" boiler, thorough order. **ALSO OTHERS.**

Flat Cars, Box Cars, SPECIAL LOT—50,000 and 60,000 lbs. ca-
pacity, equipped with Westinghouse Air
Brakes, Automatic Couplers, etc. **Also Other Equipment.**

Telegraph, telephone or write us. Correspondence Solicited,

A. G. TORBERT & COMPANY

Chicago, Ill.

547-548 Monadnock Block

Shops at Chicago

Solid Vestibule Trains

ARE RUN DAILY FROM

**CHICAGO AND CINCINNATI TO
WASHINGTON AND BALTIMORE**

VIA

Baltimore & Ohio Railroad

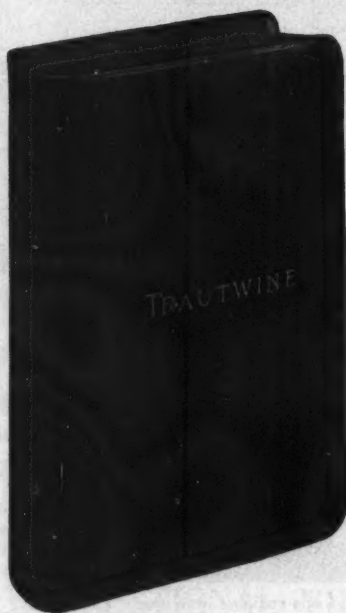
Every car in these trains, including Baggage Cars,
Day Coaches and Pullman's Palace Sleeping Cars,
is Vestibuled and Heated by Steam from the Engine.

**NO EXTRA FARE IS CHARGED. TICKETS VIA B. & O.
RAILROAD CAN BE PROCURED
FROM ANY COUPON TICKET AGENT IN THE WEST.**

HYDRAULIC JACKS

PUNCHES, TUBE EXPANDERS, ETC.
A. L. HENDERSON'S SONS
728 MARYLAND AVE., WILMINGTON, DEL.

Trautwine's Civil Engineer's Pocket Book



18th
Edition

1906

\$5.00

John Wiley
& Sons

43 East Nineteenth St.
NEW YORK

Patterson Blocks



ARE THE BEST

All Sheaves Bushed.
All Hooks made
from Staybolt Iron
and flattened. Also
Extra Heavy Oil
Well Blocks.

WRITE FOR PRICES

W. W. Patterson Company
56 Water Street PITTSBURG

Bound Volumes

**RAILWAY ENGINEERING
and Maintenance of Way
FOR 1906**

\$2⁵⁰ Per Volume

**CHICAGO
GREAT WESTERN
RAILWAY**

"Maple Leaf Route"

"THE RIGHT ROAD"

Between Chicago, St. Paul, Minneapolis, Des
Moines, St. Joseph, Kansas City, Council
Bluffs and Omaha.

J. P. ELMER, G. P. A. St. Paul, Minn.

LOCKERS

MADE
BY US

of
Expanded
Metal or
Sheet Steel
Insure a
Positive
Security
and have
Points of
Superiority
over all
others.

We also
make
Metal
Shelving,
Screens
and
Inclosures

Write for
Catalogue



MERRITT & CO.

1124 Ridge Av., PHILADELPHIA

AMERICAN VALVE & METER CO. CINCINNATI OHIO
Ponge's Water Columns, Tank Fixtures Brass Valves Babbitt Metal Water Motors

AMERICAN LOCK NUT CO.Sole Owners and
Manufacturers**Burrow's Patent
Nut Lock**Simple in construction, easy to
operate, positive in action. The
most effective Nut Lock on the
market.Mechanically perfect in every detail,
as practical demonstration will prove.*Write for Catalogue and
Sample.***AMERICAN
LOCK NUT CO.**853 Old South Street
BOSTON, MASS.**The "Wells Light"**Is the
Standard
with all
Railroads
and
Contractors**17,000** in use in the United States
and Canada.For accidents at night, for night construction.
It is "Always Ready." Unaffected by weather.
Made in sizes 600, 2,000 to 4,000 candle
power from kerosene oil.**The "Wells Light"**

(Registered Title) Wells' Patents

Since its adoption for tire expanding, has met
with unbounded success, having already
been adopted by a number of roads.**The Wells Light Manufacturing Company**

EDWARD ROBINSON, Sole Proprietor

46 Washington St., New York

CHICAGO AGENTS, CRERAR, ADAMS & CO.

**Railway Engineering
One Year--One Dollar****Watson - Stillman Hydraulic Jacks****ARE EMINENTLY ADAPTED
FOR THIS SERVICE.****H**YDRAULIC JACKS enter extensively into the maintenance of way
of every railroad, what is needed being a reliable, powerful, quick-act-
ing tool, always ready for use.**W**ITH ram and cylinder wrought and bored from High Carbon steel billets, they
are absolutely dependable. Their simple, strongly made working parts,
ensure their constant readiness for use.If you are interested in Hydraulic Jacks, the trustworthy kind, write for
our Jack list, Edition "C," showing nearly 300 varieties.**Watson - Stillman Company,****26 Cortlandt Street, New York****453 The Rookery, CHICAGO**

RAILWAY ENGINEERING

BOOK-SELLING DEPARTMENT

Any of the following books will be sent by mail, postage paid, upon receipt of the price. When ordering more than one copy state whether to be sent by express. Cash should be sent with order. Remit by postal or express money order or by bank draft on Chicago or New York. Write for our Catalogue of Books, Charts, and Models, explaining our easy payment plan.

Write for a Complete List
of Books. Address

RAILWAY ENGINEERING.

510 Security Building
CHICAGO, ILL.

TRACK AND ROADBED LOCATION, MAINTENANCE AND CONSTRUCTION.

- Street Railway Roadbed by Mason D. Pratt and C. A. Alden...\$ 2.00
The Railroad Spiral by Wm. H. Searles 1.50
Notes on Electric Railway Economics and Preliminary Engineering by W. C. Gotshall..... 2.00
The Transition Curve Field-Book by Conway R. Howard..... 1.50
The Transition Curve by C. L. Crandall 1.50
Handbook for Street Railroad Location by John P. Brooks..... 1.50
Standard Turnouts on American Railroads by F. A. Smith..... 1.00
Railway Locations in Victoria, Australia, by D. M. Fraser..... .25
Maintenance of Way Standards by 1.50
Engineering Preliminaries for an Interurban Electric Railway by Ernest Gonzenbach..... 1.00
Practical Switch Work by D. H. Lovell 1.00
The Economic Theory of the Location of Railways by Arthur M. Wellington..... 5.00
Railroad Construction by Walter Loring Webb 5.00
Field Practice of Railway Location by Willard Beahan..... 3.00
The Field Practice of Laying out Circular Curves for Railroads by J. C. Trautwine..... 2.50
The Trackman's Helper by J. Kindelan 1.50
Railway Right of Way Surveying by Albert I. Frye..... 1.00
Economics of Road Construction by H. P. Gillette..... 1.00
Railway Surveys and Resurveys by H. Paul..... 1.00
Surveying Manual; A Manual of Field and Office Methods by Pence and Ketchum..... 2.00
The Railway Transition Spiral by Prof. A. N. Talbot..... 1.50
Topographical Record and Sketch Book for Use with Transit and Stadia by D. L. Turner..... .75
Railway Track and Track Work by E. E. R. Tratman..... 3.00
Road Making and Maintenance by C. Herschel and E. P. North... .50
Maintenance of Way Standards on American Railways by F. A. Smith 2.50
Rules for Railway Location and Construction of the Northern Pacific Railway Co. by E. H. McHenry 1.00
- ### BRIDGES, BUILDINGS, STRUCTURAL WORK.
- American Railway Bridges and Buildings by Walter G. Berg... 3.50
Specifications for Steel Bridges by J. A. L. Waddell..... 1.25
Bridge and Structural Design by Thomas W. Chase.....
Properties of Steel Sections by John C. Sample..... 3.00
The Design of Simple Roof-Trusses in Wood and Steel by Malverd A. Howe..... 2.00
The Fireproofing of Steel Buildings by Joseph K. Frietag..... 2.50
The Designing of Draw-Spans by Charles H. Wright..... 3.50
Buildings and Structures of American Railroads by W. G. Berg... 5.00
A Treatise on the Theory of the Construction of Bridges and Roofs by Prof. De Volson Wood
Compound Riveted Girders as Applied in Buildings by Wm. H. Birkmire 2.00
The Planning and Construction of High Office-Buildings by Wm. H. Birkmire 3.50
A Course on the Stresses in Bridges and Roof Trusses, Arched Ribs, and Suspension Bridges by Wm. H. Burr.... 3.50
American Railroad Bridges by Theodore Cooper 2.00
The Design and Construction of Metallic Bridges by W. H. Burr
A Treatise on Wooden Trestle Bridges by Wolcott C. Foster.. 5.00
Practical Treatise on the Construction of Iron Highway Bridges by A. P. Boller 2.00
Types and Details of Bridge Construction by F. W. Skinner.... 3.00
Tables for Roof Framing by G. D. Inskip..... 3.00
Mathematical and Graphical Roof Framing by G. D. Inskip:
Vol. 1. Text, cloth, 160 pages. 1.00
Vol. 2. Tables of Reduction and Squares from Zero to 150 feet by 8ths and to 120 feet by 10ths. 1.00
A Text-Book on Roofs and Bridges by Mansfield Merriman and Henry S. Jacoby:
Part 1. Stresses in Simple Trusses 2.50
Part 2. Graphic Statics..... 2.50
Part 3. Bridge Design..... 2.50
Part 4. Higher Structures... 2.50
The Design of Steel Mill Buildings and the Calculation of Stresses in Framed Structures by M. S. Ketchum..... .50
General Specifications for High-Roofs and Buildings by Chas. E. Fowler (paper)..... .25
General Specifications for Highway Bridges by E. Thacher.... .25
Mill Building Construction by H. G. Tyrrell..... 1.00
Graphics for Engineers, Architects, Builders, by Chas. E. Greene:
Part 1. Roof Trusses..... 1.25
Part 3. Arches in Wood, Iron and Stone..... 2.50
Tables and Diagrams for Calculating the Strength of Beams and Columns by Benj. E. Winslow 2.00
- ### EARTHWORK AND MASONRY AND ITS COST.
- Specifications for Grading and Masonry for Railway Beds by W. Katte25
Table of Cubic Yards by S. B. Fisher25
Retaining-Walls for Earth by Malverd A. Howe..... 1.25
Earthwork and Its Cost by Halbert Powers Gillette..... 2.00
A Treatise on Masonry Construction by Ira O. Baker..... 5.00
A Method of Calculating the Cubic Contents of Excavations and Embankments by the Aid of Diagrams by J. C. Trautwine 2.00
Prismoidal Formulae and Earthwork by Thomas U. Taylor.... 1.50
Earth and Rock Excavation by C. Prelini 3.00
Tables for Calculating the Cubic Contents of Excavations and Embankments by John R. Hudson 1.00
Tunneling, Explosive Compounds, and Rock Drills by H. S. Drinker 25.00
Rock Excavation by Halbert Powers Gillette 3.00
Tunneling by C. Prelini, Additions by C. S. Hill..... 3.00
Ordinary Foundations by Charles Evan Fowler 3.00
Railway and Other Earthwork Tables by Charles L. Crandall.. 1.50
- ### CEMENT AND CONCRETE.
- A Treatise on Concrete, Plain and Reinforced, by Frederick W. Taylor and Sanford E. Thompson 5.00
Cement and Concrete by Louis Carlton Sabin 5.00
The Cement Industry by..... 3.00
Reinforced Concrete by A. Considere 2.00
Practical Cement Testing by W. Purves Taylor 3.00
Reinforced Concrete by A. W. Buel and C. S. Hill..... 5.00
- ### VENTILATION, HEATING, SEWERAGE.
- The Heating and Ventilation of Buildings by R. C. Carpenter.. 4.00
Tables and Diagrams for Making Estimates for Sewerage Work by S. M. Swaab..... .50
British Sewerage Works by M. N. Baker 2.00
Ventilation and Heating by John S. Billings 4.00
Electric Heating by E. J. Houston and A. E. Kennelly..... 1.00
American Plumbing Practice by.. 2.50
Cleaning and Sewerage of Cities by Prof. R. Baumeister..... 2.00
Dimensions of Pipes, Fittings and Valves by W. D. Browning... .75

BOOK DEPARTMENT (Continued)

Steam Heating and Ventilation by William S. Monroe	2.00	Experiments with Alternate Currents of High Potential and High Frequency by Nikola Tesla	1.00	Supplee's Mechanical Engineer's Reference Book by Henry Harrison Supplee	5.00
ELECTRICITY, DYNAMOS, MOTORS.		Alternating Current Transformer by F. G. Baum	1.50	A Handbook for Superintendents of Construction, Architects, Builders, and Building Inspectors by H. G. Richey	
The Induction Motor by B. A. Behrend	1.50	Static Electricity by Hobart Mason	2.00	Handbook of Cost Data by Halbert Powers Gillette	4.00
The Induction Motor; Its Theory and Design by Boy de la Tour	2.50	Diagram of Electrical Connections by Cecile P. Poole	2.00	The "Engineering" and Electric Traction Pocket-Book by Philip Dawson	5.00
Power Distribution for Electric Railways by Louis Bell	2.50	Designs for Small Dynamos and Motors by Cecile P. Poole	2.00	Reference Book of Tables and Formulas for Electric Railway Engineers by E. A. Merrill	1.00
Electric Power Transmission by Louis Bell	4.00	Dynamo Design; Its Theory and Practice by A. Press	2.00	Handbook for Surveyors by Mansfield Merriman	2.00
Long Distance Electric Power Transmission by R. W. Hutchinson, Jr.		TELEPHONY AND TELEGRAPHY.		Telephone Handbook by Herbert Laws Webb	1.00
Electricity One Hundred Years Ago and To-day by E. J. Houston	1.00	Telephony by A. V. Abbott	\$ 6.00	Field Manual for Engineers by Philetus H. Philbrick	3.00
Electric Transmission of Water Power by Alton D. Adams	3.00	Vol. 1. The Location of Central Offices	1.50	A Field Manual for Railroad Engineers by J. C. Nagle	3.00
Electric-Dynamic Machinery by E. J. Houston and A. E. Kennelly	2.50	Vol. 2. The Construction of Underground Conduits	1.50	Practical Electric Railway Handbook by Albert B. Herrick	3.00
High Tension Power Transmission by	3.00	Vol. 3. The Cable Plant	1.50	Railroad Engineers' Field-Book and Explorers' Guide by H. C. Godwin	2.50
Berlin-Zossen Electric Railway Tests of 1903 by Louis Bell	3.00	Vol. 4. Construction of Aerial Lines	1.50	Structural Designers' Handbook by Wm. Fry Scott	2.00
Recent Types of Dynamo-Electric Machinery by Edwin J. Houston and A. E. Kennelly	4.00	Vol. 5. The Substation	1.50	Manual for Resident Engineers Containing General Information on Construction by F. A. Moliter and E. J. Beard	1.00
Electrical Engineering Leaflets, Containing the Underlying Principles of Electricity and Magnetism by Edwin J. Houston and A. E. Kennelly. In three grades as follows:		Vol. 6. Switchboards and the Central Office	1.50	Electrical Catechism by Geo. D. Shepardson	2.00
Elementary Grade	1.50	Wireless Telegraphy by A. Frederick Collins	3.00	The Civil Engineer's Field-Book, by Edward Butts	2.50
Intermediate Grade	1.50	Electric Telegraphy by Edwin J. Houston and A. E. Kennelly	1.00	Plat and Profile Book for Civil Engineers and Contractors by H. F. Dunham	2.00
Advanced Grade	1.50	American Telephone Practice by Kempster B. Miller	4.00	Handbook of Mathematics by J. Claudel50
Practical Calculation of Dynamo-Electric Machines by A. E. Wiener	3.00	Synchronous and Other Multiple Telephones by Albert Cushing Crehore	2.00	Timber Test Record	1.00
Original Papers on Dynamo-Machinery and Allied Subjects by John Hopkinson	1.00	Standard Telephone Wiring by J. F. Fairman	1.00	Boston Electrical Handbook by Electrician's Handy Book by Prof. T. O'Connor Sloane	3.50
The Electric Motor by Edwin J. Houston and A. E. Kennelly	1.00	Wireless Telegraphy by Charles Henry Sewall	2.00	New York Electrical Handbook by	1.00
Alternating Electric Currents by E. J. Houston and A. E. Kennelly	1.00	The Electric Telephone by E. J. Houston and A. E. Kennelly	1.00	Handbook for Street-Railway Engineers by H. B. Andrews	1.25
The Theory and Calculation of Alternating Current Phenomena by Charles Proteus Steinmetz	4.00	Telephone Engineering by Homan Maxwell's Theory and Wireless Telegraphy by H. Poincare	2.00	Berg's Complete Timber Test Record by W. G. Berg75
The Art of Illumination by Louis Bell	2.50	Practical Features of Telephone Work by A. E. Dobbs75	Experimental Engineering by R. C. Carpenter	6.00
Electric Arc Lighting by Edwin J. Houston and A. E. Kennelly	1.00	WATER AND WATER SUPPLY.		Experimental Researches Upon the Constitution of Hydraulic Mortars H. Le Chatelier	2.00
Electric Lighting Specifications by E. A. Merrill	1.50	Diagrams of Mean Velocity of Water in Open Channels by Irving P. Church	\$ 1.50	Tables of Logarithms and Squares by Constantine Smoley	3.00
Electric Incandescent Lighting by Edwin J. Houston and A. E. Kennelly	1.00	Water-Works for Small Cities and Towns by John Goodell	2.00	Mechanics—Problems for Engineering Students by Prof. Frank B. Sanborn	1.50
Modern Electric Railway Motors by George T. Hanchett	2.00	Water Supply Engineering by A. Prescott Folwell	4.00	Tables of Logarithms of Lengths up to 50 Feet, Varying by 1-16 of an Inch by Thos. W. Marshall	2.00
The Universal Wiring Computer by Carl Hering	1.00	Water-Power by Joseph P. Frizell	5.00	Advanced Primers of Electricity by E. J. Houston	
Electricity and Magnetism by C. P. Steinmetz	2.50	Hydraulic Diagrams for the Discharge of Conduits and Canals by Swan & Horton	1.00	Vol. 1. Electricity and Magnetism	1.00
Shop and Road Testing of Dynamos and Motors by E. C. Parham and J. C. Shedd	2.50	Water-Supply Engineering by A. Prescott Folwell	4.00	Vol. 2. Electrical Measurements	1.00
Spangenberg's Steam and Electrical Engineering by Messrs. E. Spangenberg, A. Uhl, and E. W. Pratt	3.50	Engineering for Land Drainage by Charles G. Elliott	1.50	Vol. 3. Electrical Transmission of Intelligence	1.00
Storage-Battery Engineering by Lamar Lyndon	3.00	American Steam and Hot-Water Heating Practice	3.00	Experiments in Applied Electricity by Arthur Rowland and Wm. B. Creagmile	1.25
Magnetism by Edwin J. Houston and A. E. Kennelly	1.00	Some Details of Water-Works Construction by W. R. Billings	2.00	Electricity Made Easy by Simple Language and Copious Illustrations by Edwin J. Houston and A. E. Kennelly	1.50
Alternating Current Wiring and Distribution by William Leroy Emmet	1.00	Water Waste Prevention: Its Importance, and the Evils Due to Its Neglect by Henry C. Meyer	1.00		
		The Cofferdam Process for Piers by Charles Evan Fowler	2.50		
		HAND BOOKS, POCKET BOOKS, TEXT BOOKS.			
		The Civil Engineer's Pocket-Book, by John C. Trautwine	\$ 5.00		
		Foster's Electrical Engineer's Pocket-Book by H. A. Foster	5.00		
		Kent's Mechanical Engineer's Pocket-Book by William Kent	5.00		
		The Architects' and Builders' Pocket-Book by Frank E. Kidder	5.00		

RAILWAY BOARDING CAMP AND CATERING COMPANY.

Lease and Operate



DEPOT RESTAURANTS, RAILWAY HOTELS, SUMMER AND WIN- TER RESORTS.

Complete and up-to-date boarding camps and commissaries established and operated, either tent or car outfits for any number of laborers. Address,

W. M. MURPHY, President and General Manager
Windsor Hotel
MOLINE, ILL.

Kofske Improved Joint Splice

Manufactured with Round or Oblong Holes, and with or without Spike Slots as wanted. Manufactured by

J. H. SNOW

Write for Prices **INDIANAPOLIS, IND.**

For Fatter Pay Envelopes Get

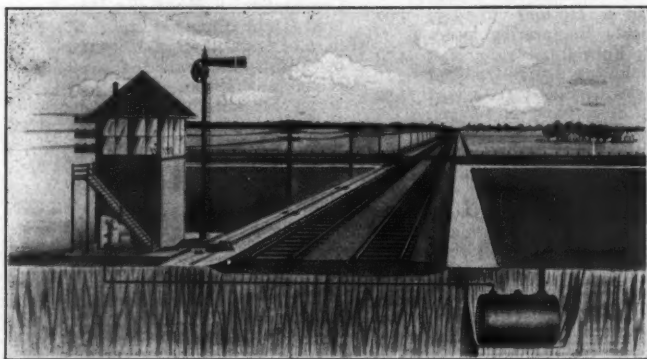
Tulley's Handbook on Engineering

If you are one of the onward and upward kind the information this book contains will be certain means to advancement along engineering lines. 'Tis full of meat—just the things you have wanted to know plainly and concisely told. When you have become familiar with its contents, examining boards of engineers will have no terrors for you. Only \$3.50 and 'tis worth dollars for every cent it costs. SEND FOR BOOKLET C.

Over 21,000 Sold, only Three Returned.

HENRY C. TULLEY & CO.
510 Wainwright Bldg. **St. Louis, Mo., U. S. A.**

Bowser Oil Storage *For Signal Towers*



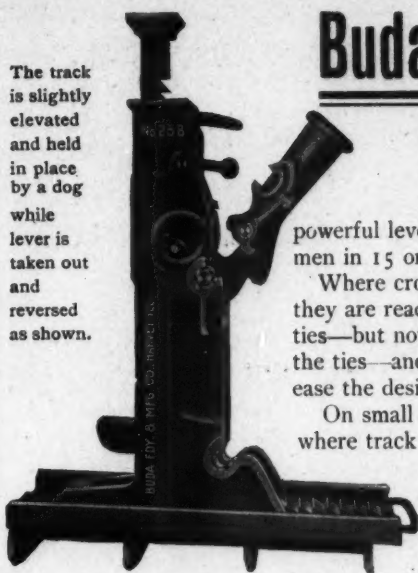
Eliminates the fire risk. The oil is buried two feet under ground. The pump, which is in the tower, can be adjusted so that only the quantity needed to exactly fill a lamp is drawn at each operation. There is no oil left over in the tower. There is no spilling, no waste, no odor. Keeps the oil pure and clean.

SEND FOR BULLETIN VII.

S. F. Bowser & Co., Inc., **FORT WAYNE, INDIANA.**

Buda Lining-Up Jack

The track is slightly elevated and held in place by a dog while lever is taken out and reversed as shown.



The advantages of these Jacks may be appreciated when it is known that two men alone can line up track, crossings, etc., and accomplish, by the powerful leverage in two minutes, more than eight men in 15 or 20 minutes.

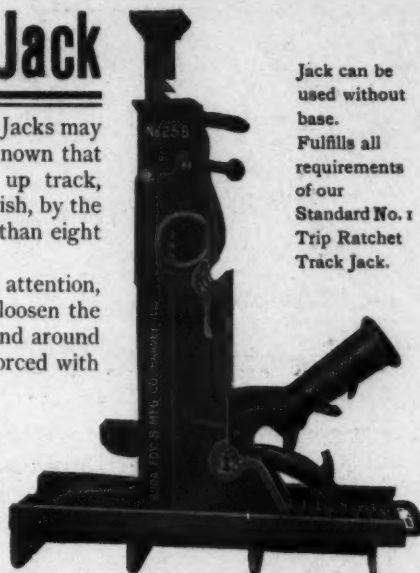
Where crossings, for instance, require attention, they are readily elevated just enough to loosen the ties—but not to allow cinders to fall in and around the ties—and then the crossing can be forced with ease the desired distance.

On small divisions and branch lines where track force is always too small to give proper attention to lining up, and during those seasons when the main line force is greatly reduced, these jacks are of great

value; for a section foreman and one man can line up track as readily as they may tighten up nuts.

The jack proper may be slid out of base and made to fit all requirements of our No. 1 standard trip jack. The jacks are of 12-ton capacity each and are used in pairs. They are a valuable acquirement and should be on every section. Order a pair of Buda Lining-up Jacks for trial.

Jack can be used without base. Fulfills all requirements of our Standard No. 1 Trip Ratchet Track Jack.



The Buda Foundry & Manufacturing Co.

CHICAGO

NEW YORK

ST. LOUIS

HARVEY, ILL.

CLARK'S PERFECT SAND DRIER



No. 1 Dries About 10 Tons a Day
No. 2 Dries About 5 Tons a Day

PARKHURST & WILKINSON CO.
Iron, Steel and Railway Supplies
CHICAGO, ILL.

The Wendt Coupler Co.

have perfected a new
Semaphore
which will be placed
on the market. Watch
the news columns of
Railway Engineering
for description of this
new signaling device.

The Wendt Coupler Co.

MARSHFIELD, WISCONSIN



RICHARD DUDGEON

*Inventor, Patentee and Original
Manufacturer of the*

**Hydraulic Jack, the Hydraulic Punch
and Roller Tube Expander**

RICHARD DUDGEON, - NEW YORK

The "Leader" STEEL CATTLE GUARD

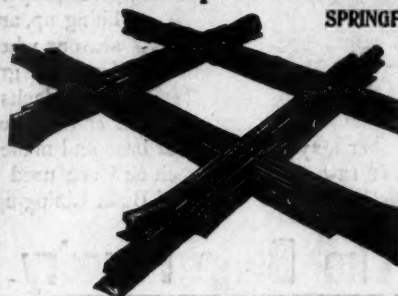


Represents
Standard Practice
**Simple,
Effective
Economical**

The W. P. Johnson Co.

25 LaSalle, Street, Chicago

The Indianapolis Switch & Frog Co. SPRINGFIELD, OHIO



Crossings
Frogs
Switches
Stands
Etc.

**IN USE WHEREVER HIGHEST GRADE WORK
IS REQUIRED**

Poages Water Columns,
Tank Outlet Valves,
Automatic Float Inlet Valves,
Tank Fixtures, Etc., Etc.
Little Giant Switch Stands,
Automatic Nut Locks.

**AMERICAN VALVE
& METER CO.**

CINCINNATI, . . . OHIO

CAREY'S Cement Roofing

The Oldest and Most Durable Composition Roofing on the Market. In use on all classes of railroad buildings throughout the United States.

Carey's Asphalt Roofing Paints

For Tin, Iron, Steel, Felt and Composition
Roofs; Bridges, Stacks, Boiler Fronts, etc.

Carey's Freight Car Roofing

2-ply, 3-ply and Burlap Center.

THE PHILIP CAREY MFG. CO.

Sole Manufacturers.

LOCKLAND, CINCINNATI, OHIO

JACKSON SHOVEL & TOOL CO.

—Manufacturers of—



**Track Shovels and
Locomotive Scoops**

MONTPELIER, INDIANA

Send for Our Catalogue.

